Sustained Attention as a Stabilizing Resource: An Inward Physics–Inspired Model of Ecological Coherence and Regeneration

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Abstract

Ecological restoration efforts frequently degrade after initial intervention despite adequate funding and technical design. This paper proposes that sustained, non-extractive human attention functions as a stabilizing resource in coupled human–environment systems by suppressing variance through early detection and correction of disturbances. Using Inward Physics strictly as a modeling language, attention is formalized as a time-integrated presence that reinforces ecological feedback loops without invoking psychological or metaphysical claims. We introduce the Attention–Coherence Hypothesis (ACH), derive falsifiable predictions, define measurable ecological proxies, and present a low-cost field protocol suitable for citizen science and professional monitoring. The framework reframes ecological repair as a continuity problem rather than a motivation problem and offers testable implications for restoration ecology, stewardship design, and environmental policy.

Keywords: sustained attention; ecological stability; restoration ecology; feedback control; stewardship continuity

1 Introduction

Global ecological degradation persists despite increased awareness, funding, and technical capacity (IPBES, 2019). A recurring failure mode across restoration efforts is discontinuity: interventions are implemented, documented, and subsequently abandoned, allowing minor disturbances to compound into systemic degradation. This pattern suggests a missing stabilizing variable rather than a lack of resources or intent.

This paper proposes that sustained human attention—defined as repeated presence, monitoring, and small corrective action—acts as a stabilizing resource in ecological systems. The claim is mechanistic, not moral: continuity suppresses variance by enabling early detection and low-cost correction before disturbances cascade.

2 Conceptual Framework

2.1 Ecological coherence

Ecological coherence refers to the persistence of organized structure under disturbance. Coherent systems maintain soil aggregation, vegetation cover, and hydrologic pathways across seasonal and stochastic variation. Incoherent systems exhibit fragmentation, erosion, invasive dominance, and escalating maintenance requirements.

2.2 Modeling language

Inward Physics introduces a memory-density construct describing accumulated structural persistence. In this work, it is used strictly as a modeling metaphor for ecological memory (e.g., soil structure, root networks, successional patterning). All hypotheses are tested using observable ecological proxies rather than inferred internal states.

2.3 Attention as a stabilizing input

Let instantaneous attention be $a(t) \geq 0$, representing time on-site weighted by engagement type. Cumulative attention is defined as:

$$A(t) = \int_0^t a(\tau)\, d\tau. \tag{1}$$

Let $C(t)$ denote an ecological coherence proxy. We propose:

$$\frac{dC}{dt} = k\, \Phi(A(t)) - \lambda D(t), \tag{2}$$

where $D(t)$ represents disturbance drivers, Φ is a monotone function mapping sustained attention into stabilizing feedback, and $k, \lambda > 0$ are coupling constants.

2.4 Episodic failure mode

In episodic regimes, $A(t)$ is discontinuous. Variance accumulates between interventions, yielding:

$$\mathbb{E}[\Delta C] < 0 \quad \text{as } \Delta t_{\text{gap}} \to \infty. \tag{3}$$

This formalizes why one-off restoration efforts frequently fail despite initial success.

3 Attention–Coherence Hypothesis

ACH. Holding material inputs constant, sites receiving sustained, non-extractive human attention will exhibit greater ecological coherence than matched sites receiving episodic or fragmented attention.

3.1 Falsification conditions

The hypothesis is weakened or falsified if:

- Control sites improve at equal or greater rates without sustained presence.
- Episodic interventions outperform continuous attention across multiple sites.
- Attention dose fails to predict coherence change after controlling for baseline conditions and environmental covariates.

4 Measurement Proxies

Coherence is operationalized using repeatable ecological metrics:
Soil: penetration resistance, infiltration rate, organic matter.
Vegetation: percent cover, species richness, seedling survival.
Hydrology: runoff indicators and bank stability (where applicable).

5 Field Protocol: The 90-Day Earth Anchor

Two matched plots are monitored over 90 days. One receives sustained attention; the other serves as a control. Interventions are minimal and non-extractive. Attention dose is logged per session and correlated with coherence change.

Citizen science reliability is ensured through standardized rubrics and fixed photo stations (Follett and Strezov, 2015; Kosmala et al., 2016).

6 Implications

6.1 Ecology

Sustained attention prevents small degradations from compounding, preserving habitat continuity for pollinators, birds, trees, and aquatic systems.

6.2 Policy

Environmental funding and governance should prioritize continuity incentives over one-time interventions.

6.3 Limits

This framework does not claim attention replaces material resources, technology, or policy. It specifies a necessary stabilizing condition for their effectiveness.

7 Conclusion

Ecological systems respond less to episodic effort than to sustained presence. Treating attention as a stabilizing resource reframes regeneration as a control problem and provides a practical, testable pathway for protecting living systems.

References

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Figure A1: Sustained Attention Stabilizes Ecological Feedback

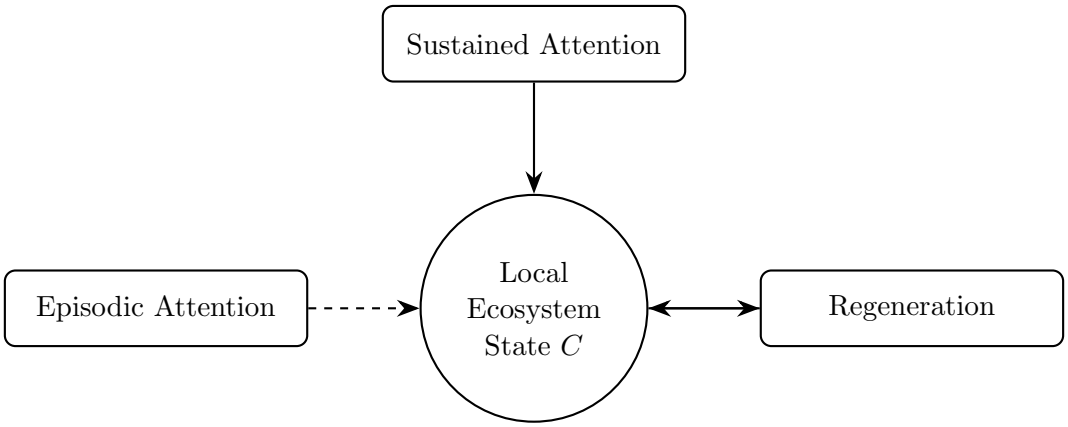

Figure note. Continuous human presence reinforces stabilizing feedback loops, while episodic attention permits drift and degradation.

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